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2...3.4) in a part (1) comprising a porous material having cavities
3 or in which cavities can be produced by pressure, the joining
4 element including a thermoplastic material at least at the location
5 of a preselected anchoring point, the method comprising the steps
6 of

7 forming a bore in the part (1), the bore having an inner closed end
8 and being matched to the shape and dimensions of the joining
9 element so that the joining element can be inserted into a first
10 position in the bore with substantially no force,

11 positioning the joining element in the bore in the first position,

12 applying pressure to force the bore into a second, deeper position
13 in the bore, the pressure being applied substantially along a
14 central axis of the bore and producing an increase of pressure at
15 the preselected anchoring point (31, 33) between the joining
16 element and walls of the bore,

17 during the application of pressure, applying energy to the joining
18 element to cause the thermoplastic to plasticize at the preselected
19 anchoring point, the pressure causing the plasticized thermoplastic
20 material to flow into pores or cavities of the part (1) adjacent
21 the bore, thereby forming a macroscopic anchoring connection

22 ^{Sub} ~~21~~ between the part and the joining element. --

1 -- 24. A method according to claim 23 wherein the
2 preselected anchoring point is adjacent the closed end of the bore,
3 and wherein, in the first position of the joining element, an inner
4 end thereof is adjacent the closed end of the bore. --

1 -- 25. A method according to claim 23 including providing
2 the joining element and the bore with matching reductions in
3 diameter forming a shoulder in the bore and a shoulder on the
4 joining element, wherein the preselected anchoring point is
5 adjacent the closed end of the bore, and wherein, in the first
6 position of the joining element, the joining element shoulder rests
7 on the bore shoulder. --

1 ^{Sub} ~~21~~ -- 26. A method according to claim 23 including joining a
2 second part (2) made of a porous material to the first-mentioned
3 part (1) with the joining element, wherein the joining element is a
4 joining pin having a reduction in diameter intermediate the ends
5 thereof forming a shoulder, wherein the step of forming a bore
6 includes forming a portion of the bore through the second part and

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9 into the first part to an inner closed end, the bore in the second
10 part having a reduction in diameter matching the reduction in
11 diameter of the joining pin, and the step of positioning includes
12 inserting the joining pin into the first and second parts with the
13 shoulders of the joining pin and bore in contact to define the
14 first position, the contacting shoulders forming a second
macroscopic connection between the second part and the joining
element. --

1 -- 27. A method according to claim 23 including joining a
2 second part (2) made of a porous material to the first-mentioned
3 part (1) with the joining element, wherein the joining element is a
4 joining pin, wherein the step of forming a bore includes forming a
5 portion of the bore through the second part and into the first part
6 to an inner closed end, and wherein the joining pin has an enlarged
7 head portion on an outer end thereof. --

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1 -- 28. A method according to claim 23 including fixedly
2 attaching the joining element to the second part. --

1 -- 29. A method according to claim 28 wherein the step of

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2 ^{SUB} 61 fixedly attaching is performed before positioning the joining
3 element in the bore. --

1 -- 30. A method according to claim 23 wherein the step of
2 applying energy includes ultrasonically exciting the joining
3 element to cause the thermoplastic to plasticize. --

1 -- 31. A method according to claim 23 wherein the joining
2 element consists entirely of thermoplastic material capable of
3 being plasticized in the region of an anchoring point at a lower
4 temperature than the remainder of the element, and wherein the step
5 of applying energy includes heating the joining element. --

1 -- 32. A method according to claim 23 including
2 incorporating metal particles in the thermoplastic material at
3 least in the region of the preselected anchoring point, and wherein
4 the step of applying energy includes inductively heating the
5 joining element. --

1 ^{SUB} C3 33. A method according to claim 23 wherein the part (1,

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2.2) comprises wood or a wood-like material. --

1 sub 67 -- 34. A method according to claim 23 wherein the part
2 comprises at least one of sandstone, porous ceramic, burnt brick or
3 concrete. --

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1 sub 67 -- 35. A method for anchoring a joining element (3, 3.1,
2 ...3.4) in a structural component having a cavity or in which a
3 cavity can be produced by pressure, the joining element including a
4 thermoplastic material at least at the location of a preselected
5 anchoring point, the method comprising the steps of
6 forming a bore in the component (1) with the bore having an inner
7 closed end so that the joining element can be inserted into a first
8 position in the bore with substantially no force,
9 positioning the joining element in the bore in the first position,
10 applying pressure to force the bore into a second, position in the
11 bore, the pressure being applied substantially along a central axis
12 of the bore and producing an increase of pressure at the
13 preselected anchoring point between the joining element and the

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14 ^{SUB} ~~13~~ bore,

15 during the application of pressure, applying energy to the joining
16 element to cause the thermoplastic material to plasticize at the
17 preselected anchoring point, the pressure causing the plasticized
18 thermoplastic material to flow into one or more cavities of the
19 component (1), thereby forming a macroscopic anchoring connection
20 between the component and the joining element. --

002110 " 922300"
1 ^{SUB} 36. A joining element for attachment in a bore having a
2 closed inner end in a part comprising a porous material, said
3 joining element comprising
4 a body shaped and dimensioned to be inserted to a first position
5 into the blind bore with substantially no force, said body having
6 a thermoplastic material at a first preselected anchoring
7 point at said closed inner end of said bore in said first
8 position, and
9 a thermoplastic material at a second anchoring point in said
10 bore and spaced from said first anchoring point,

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11 ^{Sub} ~~11~~ said thermoplastic material at said first and second anchoring
12 ^{DS} ~~12~~ locations being plasticizable by the application of energy and
13 pressure to form macroscopic anchoring connections with said part
14 ~~14~~ in said bore. --

1 -- 37. A joining element for attachment in a bore having a
2 closed inner end in a part comprising a porous material, said
3 joining element comprising

4 a body shaped and dimensioned to be inserted to a first position
5 into the blind bore with substantially no force, said body having

6 a thermoplastic material at a first preselected anchoring
7 point at said closed inner end of said bore in said first
8 position, and

9 an enlarged portion forming a head on said anchoring element,
10 said head being at an outside end of said bore in said first
11 position,

12 said thermoplastic material at said first anchoring location being
13 plasticizable by the application of energy and pressure to form a
14 macroscopic anchoring connection with said part in said bore. --

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B3 sub B17

1 -- 38. A joining element according to claim 37 wherein said
2 element is formed as an elongated pin and includes a second
3 anchoring point spaced from said first anchoring point and lying
4 within said bore in said first position. --

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1 sub E2 39. A joining element according to claim 38 and
2 including an internally threaded opening for receiving an
3 attachment. --

1 -- 40. A joining element according to claim 38 consisting
2 entirely of thermoplastic material. --

1 sub D2 41. A joining element according to claim 40 wherein said
2 thermoplastic material at said anchoring points is plasticizable at
3 a lower temperature at said anchoring points than at other portions
4 of said joining element. --

1 sub E2 42. A joining element according to claim 38 comprising

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2 thermosetting material having portion of thermoplastic material at
3 said preselected anchoring points. --

1 -- 43. A joining element according to claim 38 wherein said
2 thermoplastic material at said anchoring points includes metal
3 particles incorporated in said thermoplastic material. --

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SUB D37
1 -- 44. A joining element according to claim 38 wherein an
2 inner end of said element is shaped with a point. --

SUB E27
1 -- 45. A joining element according to claim 38 wherein an
2 inner end of said element is flat or concave. --

1 -- 46. A joining element according to claim 37 wherein said
2 thermoplastic material selected from the group consisting of
3 polyamide, polycarbonate, polyester carbonate, acrylonitrile-
4 butadiene-styrene, styrene-acrylonitrile, polymethylmethacrylate,
5 polyvinyl chloride, polyethylene, polypropylene and polystyrene. --